

CLAIMS

1. An enclosed type air cooler device which is constituted by
a rotational electrical machine and a cooler device, wherein
its main structure characteristics include the following:
- A rotational electrical machine which is mainly referred to the rotational machines such as motors or generators, etc., whereof it is characterized that a air inlet and an air outlet are provided at its casing and through a fan simultaneously driven by the power output shaft of the rotational electrical machine, or an independently installed fan device or both of them installed simultaneously to pump the air or other selected gases inside the rotational electrical machine to allow the cooling air stream flow through the outlet to the enclosed type air cooler for indirect heat dissipation, then is pumped back to the rotational electrical machine;
 - A cooler device, whereof it and the rotational electrical machine casing appear individually independent structures and are further combined, or it and the rotational electrical machine appear in an integrated structure, or it and the casing of other peripheral mechanisms with cooling effects (such as the driving device casing or load casing) appear in an integrated structure; therein outside of the cooler device can be installed with heat dissipating fins for free air cooling or fanned air cooling or coolant cooling, whereof the cooler devices are constituted by tubular shape structures or other geometric shape structures, whereof its interior appears in tubular shape or air chamber type structures

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and the heat absorbing fins can be installed to absorb and transfer the heat energy for dissipation to the outside; wherein the internal air flow circuit or air chamber can be an empty space or can be installed with a air filter device or can be simultaneously installed with an clean cover or a clean plug for opening and closing to do cleaning and maintenance as well as removing the condensed moisture or internal eroded fragment powders such as the DC machine brush fragment powder.

2. The enclosed type air cooler device of the rotational electrical machine as in claim 1, whereof it is comprised of that an air outlet and an air inlet are provided at the front and rear end of the casing of the said rotational electrical machine, an integrally installed air cooler is further installed at the outside of the casing, and the rotational electrical machine is enclosed by the casing of the said cooler, whereby the casing of the cooler device and the casing of the rotational electrical machine form the tubular shape which is connected with the inlet and the outlet, besides, the power output shaft located at the outlet side of the rotational electrical machine is installed with a centrifugal type radial or axial fan; the casing of the cooler device can be installed with several heat dissipating fins which allow the cooler device to match with other cooler devices.

3. The enclosed type air cooler device of the rotational electrical machine as in claim 2, wherein the piping between the rotational electrical machine and the cooler device is installed with heat absorbing fins which cause the piping forms a bended circuit shape, whereby the heat energy is

absorbed by the said heat absorbing fins and transferred to the outside to further improve the overall heat dissipation effect of the rotational electrical machine.

4. The said enclosed type air cooler device of the rotational electrical machine as in claim 1, wherein the rotational electrical machine and the cooler device can be further made in the separated structures, whereof the inlet and outlet are provided at the casing of the said rotational electrical machine, whereof a centrifugal type radial or axial fan is installed on the power output shaft at the outlet side; whereof the said cooler device forms a tubular circuit structure, whereof besides of blended shape, it can be also formed to helical shape or other irregular shapes; whereof the said cooler device can be matched with other cooler devices.

5. The said enclosed type air cooler device of the rotational electrical machine as in claim 1, wherein the said cooler is an independent structure and appear in a bended piping casing, whereof one or more than one heat dissipating fins are installed at the outside of the casing; whereof the inlet and outlet are respectively provided at selected locations on the casing of the said rotational electrical machine, further, its internal power output shaft is also installed with a centrifugal type radial or axial fan, wherein the inlet of the cooler device is connected to the outlet of the rotational electrical machine, and the said cooler device is further connected to the inlet of the rotational electrical machine to allow the said cooler device to be attached or ring installed at the outside of the casing whereby to cause the cooler device and the casing of the

rotational electrical machine appear a special and inter-combined structure; thereby the hot gas is pumped to the cooler device through the centrifugal type radial or axial fan to achieve the aforesaid circulating heat dissipation effect.

6. The said enclosed type air cooler device of the rotational electrical machine as in claim 1, wherein the cooler device is comprised of a casing with an internally installed air chamber, whereof the outside of the casing is installed with several heat dissipating fins and the inside of the air chamber is installed with heat absorbing fins whereby to cause the said air chamber constitute a bended circuit shape, and the both ends of the casing are respectively provided with inlet and outlet; besides, the inlet and the outlet are respectively provided at proper locations on the casing of the said rotational electrical machine, whereof its internal power output shaft is installed with a centrifugal type radial or axial fan, therein the inlet pipe of the said cooler device is connected to the outlet of the rotational electrical machine, while the outlet pipe of the said cooler device is further connected to the inlet of the rotational electrical machine thereby to allow the said cooler device be attached to the outside of the casing, wherein the cooler device and the casing of the rotational electrical machine are individually independent structures and they are further combined; thereby the hot gas is pumped to the cooler device through the centrifugal type radial or axial fan installed inside the said rotational electrical machine to achieve the aforesaid circulating heat dissipating effect.

7. The said enclosed type air cooler device of the rotational electrical machine as in claim 6, wherein the cooler device and the rotational electrical machine of the invention can also be separated and interconnected through the inlet pipe and the outlet pipe whereby to constitute an enclosed type air cooling circuit structure of the invention, wherein the said cooler device can be installed at other proper locations as required, the cooler device can also be installed on the casing of other machines and is further matched with other cooler devices.
8. The said enclosed type air cooler device of the rotational electrical machine as in claim 1, wherein the cooler device of the invention can be directly designed to have an integrated structure with other devices, whereof the cooler device is in an integrated structure with the casing of the transmission mechanism and the outside of the casing is made into a air chamber, wherein several heat absorbing fins are installed at the inside of the said air chamber, and through the arrangement of the heat absorbing fins to make the air chamber constitute a bended circuit shape to improve its heat absorbing effect; thereof through the combination of the said rotational electrical machine and the casing of the transmission mechanism, its outlet can be connected to the inlet of the cooler device, and the circuit end of the air chamber is connected with an outlet pipe which is further connected to the inlet of the rotational electrical machine thereby to constitute the enclosed type cooling flow circuit structure of the invention whereby to achieve the aim of improving the heat dissipating effect of the rotational electrical machine.

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9. The said enclosed type air cooler device of the rotational electrical machine as in claim 1, wherein the transport methods for the cooling air or other gases include: The rotating shaft of the rotational electrical machine is installed with a centrifugal type radial or axial fan to transfer the air or other gases.
10. The said enclosed type air cooler device of the rotational electrical machine as in claim 1, wherein the transport methods for the cooling air or other gases include: A gas pump is additionally installed at the inlet or outlet of the rotational electrical machine, or piping or the cooler devices etc. to pump the air or other gases inside the rotational electrical machine.
11. The said enclosed type air cooler device of the rotational electrical machine as in claim 1, wherein the transport methods for the cooling air or other gases include: A centrifugal type radial or axial fan is simultaneously installed at the rotating shaft of the rotational electrical machine, and a gas pump is further installed at the locations such as such as the inlet or outlet or pipe or the cooler device to pump the air or other gases inside the rotational electrical device.
12. The said enclosed type air cooler device of the rotational electrical machine as in claim 1, wherein the internal air chamber of the cooler device can be an empty space or installed with internal heat conducting fins or can be further installed with air filter devices or simultaneously installed with an clean cover or clean plug for opening/closing to remove the condensed moisture or the internally eroded fragment powders generated inside

the rotational electrical machines such as the brush fragment powders of the DC machines thereby to avoid affecting the operating functions.

- 5 13. The said enclosed type air cooler device of the rotational electrical machine as in claim 1, wherein the cooler device is matched with a free air cooler device or matched with a conventional forced air cooler device; in addition, a cooling circuit can be further provided inside the cooler device to match with a liquid cooler device or to match with a heat exchanger device.
- 10 14. The said enclosed type air cooler device of the rotational electrical machine as in claim 1, wherein the said cooler device can also be used to provide a heating source function, wherein the pipe can be coupled with the heating target, and the hot gas produced by the rotational electrical machine is passed through the pipe to heat up the heating target coupled with the pipe such as the car batteries.
- 15 15. The said enclosed type air cooler device of the rotational electrical machine as in claim 1, wherein a distributing pipe and a control valve can be further installed between the inlet and outlet of the pipe toward the heating target to provide a bypassed or distributed hot gas flow for the cooler device, and to further control the heating temperature of the heating target through switching the said control valve.
- 20 16. The said enclosed type air cooler device of the rotational electrical machine as in claim 15, wherein the said control valve can be operated manually or controlled through detection of the conventional temperature sensor device
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which is selectively installed according to the requirements on the heating target to do bypass or distributing flow when reaching the set temperature in order to reduce or stop the heating process on the target objects.

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17. The said enclosed type air cooler device of the rotational electrical machine as in claim 14 or claim 15, wherein the outside of the said pipe can be further installed with a air guiding pipe to provide heat exchanged output from the

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hot gas flow produced by the rotational electrical machine so as to provide heating gas for other places' use.

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